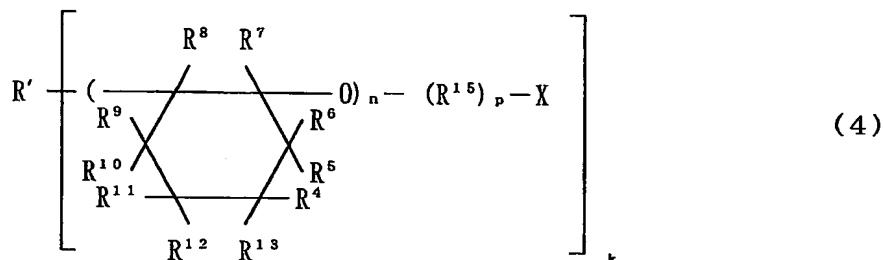


CLAIMS

1. A polyether compound represented by the following formula (4) having two or more polymerizable unsaturated groups and one or more acid groups in a molecule.



[In the formula (4):

R' is a residue $-RH_{m-k}$ of an organic compound RH_m containing m active hydrogens in a molecule or a group derived from the residue (where m is an integer of 1 to 30 and k is 1 to m);

R^4 to R^{13} are each a hydrogen atom, a C_1 - C_{10} hydrocarbon group, or a C_1 - C_{10} hydrocarbon group having a polymerizable unsaturated group (where the polymerizable unsaturated group contains $-OCO-CR^3=CR^1R^2$, R^1 and R^2 are hydrogen atoms, R^3 is a hydrogen atom or a C_1 - C_{10} hydrocarbon group, and another group may be placed between the hydrocarbon group and $-OCO-CR^3=CR^1R^2$), and at least one of R^4 to R^{13} is a C_1 - C_{10} hydrocarbon group having the polymerizable unsaturated group;

R^{15} is a residue of a polybasic acid anhydride;

x is $-COOH$, $-PO(OH)_a(OR)_b$, or $-SO_3R$ (where R is a hydrogen, a methyl group, or an ethyl group, a is 1 or 0, and $a + b = 2$);

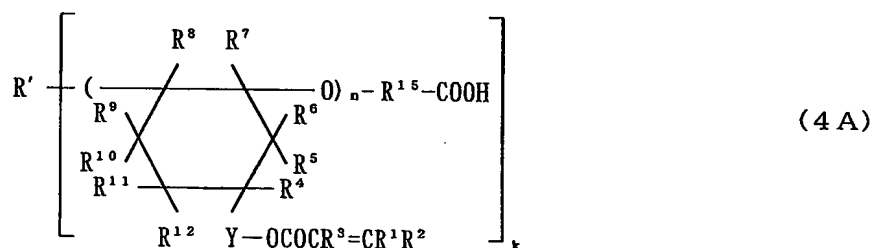
n is an integer of 1 or more, and a total of n in a molecule is 2 to 50; and

P is an integer of 0 when x is $-\text{PO}(\text{OH})_a(\text{OR})_b$ or $-\text{SO}_3\text{R}$ and 1 or more when x is $-\text{COOH}$]

2. A polyether compound according to claim 1, wherein the polymerizable unsaturated group comprises a (meth)acryloyloxy group.

3. A polyether compound according to claim 1, wherein the acid group comprises a carboxyl group.

4. A polyether compound according to claim 1, represented by the following formula (4A) having two or more (meth)acryloyloxy groups and one or more carboxyl groups in a molecule.



[In the formula (4A):

R' is a residue $-\text{RH}_{m-k}$ of an organic compound RH_m containing m pieces of active hydrogen in a molecule or a group derived from the residue (where m is an integer of 1 to 30 and k is 1 to m);

R^4 to R^{12} are each a hydrogen atom or a C_1 - C_{10} hydrocarbon group;

$-\text{OCO}-\text{CR}^3=\text{CR}^1\text{R}^2$ is a (meth)acryloyloxy group,

Y is one of the following structural formulas

$-(\text{CH}_2)_{n1}-$,

$-(\text{CH}_2)_{n1}-(\text{OCO}(\text{CH}_2)_4)_{n2}-$,

$-(\text{CH}_2)_{n1}-(\text{OCO}(\text{CH}_2)_5)_{n2}-$, and

$-(\text{CH}_2)_{n1}-(\text{OCOCH}_2-\text{CH}(\text{CH}_3)-(\text{CH}_2)_2)_{n2}-$

(where **n1** is 1 to 6, hydrogen may be partially substituted with a methyl group, an ethyl group, or a propyl group, and **n2** is 1 to 10);

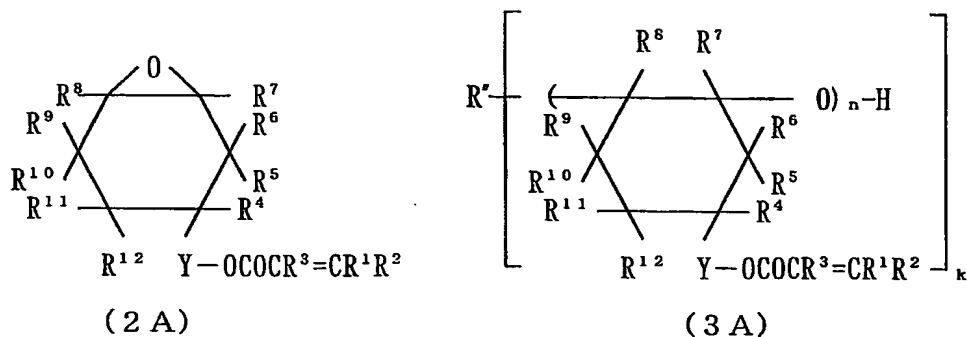
R^{15} is a residue caused by ring-opening of a polybasic acid anhydride; and

n is an integer of 1 or more, and a total of **n** in a molecule is 2 to 50]

5. A polyether compound according to any one of claims 1 to 4, wherein the polybasic acid anhydride comprises at least one selected from the group consisting of tetrahydrophthalic anhydride, 4-methyl tetrahydrophthalic anhydride, 3-methyl tetrahydrophthalic anhydride, 3,4,5,6-tetrahydrophthalic anhydride, and hexahydrophthalic anhydride.

6. A polyether compound according to claim 1, represented by the following formula (4A'), wherein the organic compound RH_m containing **m** pieces of active hydrogens in a molecule is prepared by reacting

a polybasic acid anhydride with a compound represented by the following formula (3A) prepared by carrying out a reaction between a compound represented by the following formula (2A) and carboxylic acids, alcohols, phenols, amines, thiols, or silanols (they are represented by R^*H_m , where m is an integer of 1 to 30).



[In the formula (2A):

R^1 and R^2 are hydrogen atoms, and R^3 is a hydrogen atom or a methyl group;

R^4 to R^{12} are each a hydrogen atom, a methyl group, an ethyl group, or a propyl group; and

Y is any one of the following structural formulas

- $(CH_2)_{n1}$ -,
- $(CH_2)_{n1}-(OCO(CH_2)_4)_{n2}$ -,
- $(CH_2)_{n1}-(OCO(CH_2)_5)_{n2}$ -, and
- $(CH_2)_{n1}-(OCOCH_2-CH(CH_3)-(CH_2)_2)_{n2}$ -

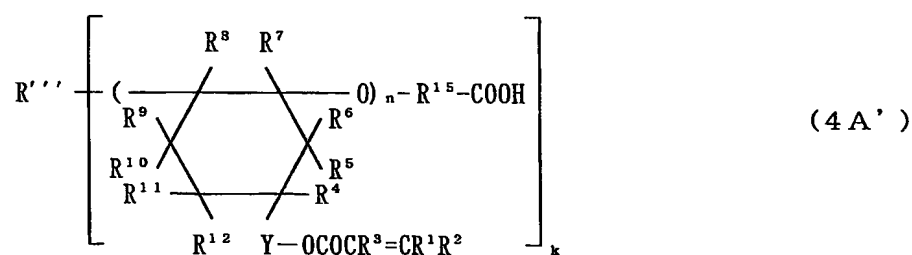
(where $n1$ is 1 to 6, hydrogens may be partially substituted with a methyl group, an ethyl group, or a propyl group, and $n2$ is 1 to 10)]

[In the formula (3A):

R'' is a residue $-R^*H_{m-k}$ of carboxylic acids, alcohols, phenols, amines, thiols, or silanols (where m is an integer of 1 to 30 and k is 1 to m);

R^1 to R^{12} and Y are the same as those of the formula (2A); and

n is an integer of 1 or more and a total of n in a molecule is 2 to 50.]



[In the formula (4A'):

R''' is a residue $-R^*H_{m-k}$ or a group derived from a reaction of the residue with a polybasic acid anhydride;

R^1 to R^{12} , Y , and n are the same as those of the formula (3A); and

R^{15} is a residue of a polybasic acid anhydride]

7. A polyether compound according to any one of claims 1 to 6, wherein the organic compound containing m pieces of active hydrogen in a molecule comprises trimethylol propane.

8. A polyether compound according to claim 6 or 7, wherein the compound represented by the formula (2A) comprises 3,4-epoxycyclohexylmethyl (meth)acrylate.

9. A polyether compound according to any one of claims 1 to 8, wherein an acid value (solid content-corresponding value) is 5 to 150 KOH mg/g.

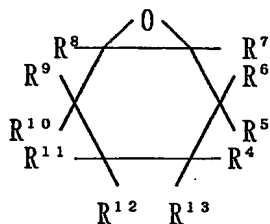
10. A curable resin composition characterized by comprising the polyether compound according to any one of claims 1 to 9, another curable resin, and/or an ethylenic unsaturated compound.

11. A curable resin composition according to claim 10, wherein the other curable resin comprises a resin obtained by adding a (meth)acrylic acid/(meth)acrylate copolymer with the compound represented by the formula (2A) described in claim 6.

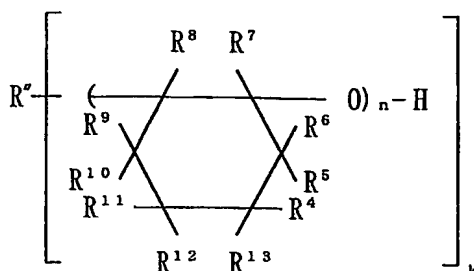
12. A cured article obtained by curing the curable resin composition according to claim 10 or 11.

13. A process for producing a polyether compound represented by the formula (4) described in claim 1, comprising the steps of:

reacting an organic compound RH_m containing m pieces of active hydrogens in a molecule (where m is 1 to 30) with a compound represented by the following formula (2) to obtain a compound represented by the following formula (3):



(2)



(3)

[In the formula (2):

R^4 to R^{13} are each a hydrogen atom, a C_1 - C_{10} hydrocarbon group, or a C_1 - C_{10} hydrocarbon group having a polymerizable unsaturated group (where the polymerizable unsaturated group contains $-OCO-CR^3=CR^1R^2$, R^1 and R^2 are hydrogen atoms, R^3 is a hydrogen atom or a C_1 - C_{10} hydrocarbon group, and another group may be placed between the hydrocarbon group and $-OCO-CR^3=CR^1R^2$), and at least one of R^4 to R^{13} is a C_1 - C_{10} hydrocarbon group having the polymerizable unsaturated groups.]

[In the formula (3):

R'' is a residue $-RH_{m-k}$ of an organic compound containing m pieces of active hydrogens in a molecule (where m is an integer of 1 to 30 and k is 1 to m);

R^4 to R^{13} are the same as those of the formula (2); and

n is an integer number of 1 or more and a total of n in a molecule is 2 to 50]; and

reacting the compound represented by the formula (3) obtained as described above with any one of polybasic acid anhydride, phosphoric acid, ethylphosphate, diethylphosphate, monoalkyl ester

or dialkyl ester of glucose phosphate, sulfuric acid, methyl sulfate, and ethyl sulfate.

14. A process for producing a polyether compound according to claim 13, wherein a chemical equivalent ratio (the compound represented by the formula (3)/polybasic acid anhydride) is 1 to 30.

15. A process for producing a polyether compound according to claim 13 or 14, further comprising ventilation of a reaction system with a gas mixture containing oxygen.

16. An image-forming material comprising the polyether compound represented by the formula (4) described in claim 1, other curable resin, and/or an ethylenic unsaturated compound as essential ingredients.

17. An image-forming material according to claim 16, wherein the other curable resin comprises a resin obtained by adding a (meth)acrylic acid/(meth)acrylate copolymer with the compound represented by the formula (2A) described in claim 6.